HSE Higher School of Economics, Moscow

Research Seminar

6 April 2012

Performance Persistence of Hedge Funds

Pascal Gantenbein, Stephan Glatz, Heinz Zimmermann

Prof. Dr. Pascal Gantenbein

Department of Financial Management
WWZ, University of Basel
www.wwz.unibas.ch/fmgt
pascal.gantenbein@unibas.ch

Executive School-HSG
University of St. Gallen
www.mba.unisg.ch
pascal.gantenbein@unisg.ch

Executive Summary

Purpose	• Empirical analysis of **hedge funds performance persistence** (“return competitiveness”): Does past return provide any indication for future returns?
Data	• **Hedge Fund Research** (HFR) database: out of a total of >12’000 funds (both **live and dead funds**) selection of **4,788 funds** (final sample) covering **five hedge fund strategies** • Investigation period: **01/1994 to 12/2008**
Methodological Framework	• Contingency-table based framework: **time horizon**, **performance measurement**, and **statistical test methodology** • Analysis on **aggregated** and **individual** fund level
Main Results	• **Six-factor regression model** explains a significant proportion of the variance of the aggregated hedge fund sample returns – MSEM, Rm-Rf, BCGHY, GSCI, MOM, SMB • The proportion of statistically significant persistent funds **decreases as time horizons are lengthened** – results are confirmed for all five hedge fund strategies • Persistence of **live funds** is primarily driven by **constant winners**, while the persistence of **dead funds** is primarily driven by **constant losers** • Accounting for **advance notice periods** (ANP) and **investor trading restrictions** (ANP, subscription/redemption periods, information time lag) significantly reduces persistence • Funds exhibiting **multiple performance persistence** are extremely rare – low probability to select a persistent winner fund across multiple time horizons
Robustness Checks	• Test of four **sub-periods** (bear and bull markets) and **90-to-10** percentile return data • Overall, robustness test **confirm results** and offer **additional findings**
Concluding Remarks	• Results are of **high practical relevance** providing **new empirical evidence**

© Prof. Dr. Pascal Gantenbein

Literature Review and Research Gaps

Existing Research

- Detailed analysis of **99 existing studies**:
  - 38 studies on **HF performance persistence** (1998-2009)
  - 61 studies on **HF performance measurement** (1997-2009)
- **Databases**: HFR, TASS, CISDM
- **Investigation periods**: vast majority until 2005 data only
- **Time horizons**: 1 to 42 months
- **Performance measures**: return, alpha, Sharpe ratio
- **Methodology**: Contingency-table based tests (chi-square test and cross-product ratio test), regression, ranking-based test

➢ HF generate superior risk-adjusted returns

➢ Evidence for performance persistence at short-term horizons

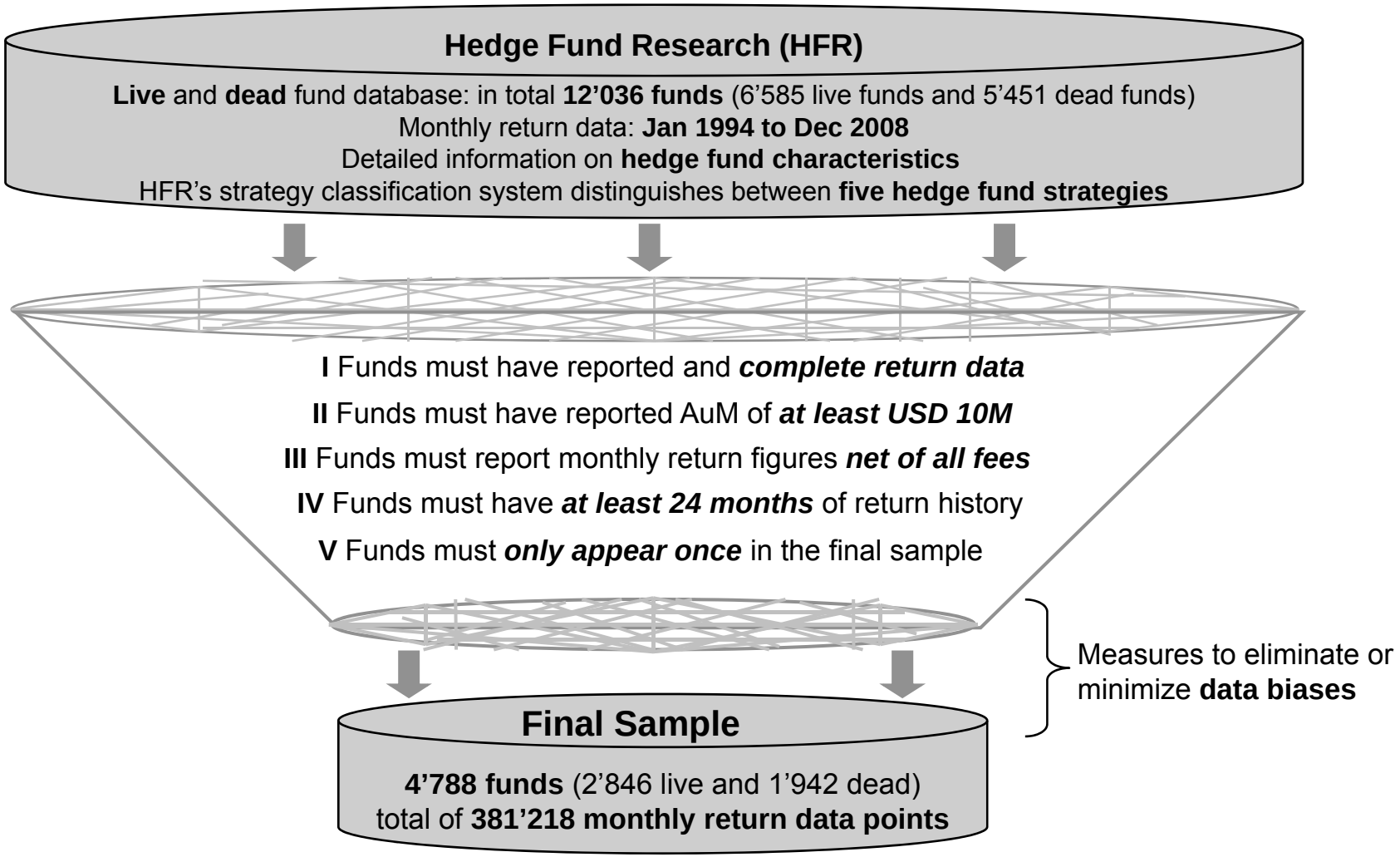
Research Gaps and Own Contribution

- Overall, **empirical results** among academic studies differ considerably and knowledge remains incomplete

- Our research **extends existing research**:
  - **Investigation period**: 1994 to 2008 (different market conditions)
  - High quality **data sample** due to different sample selection process
  - Analysis within **five HF strategies**
  - Analysis of differences between **live and dead funds**
  - Accounting for **investor restrictions**: advance notice period, subscription / redemption intervals, and information time lags
  - Analysis of **multiply persistent** funds

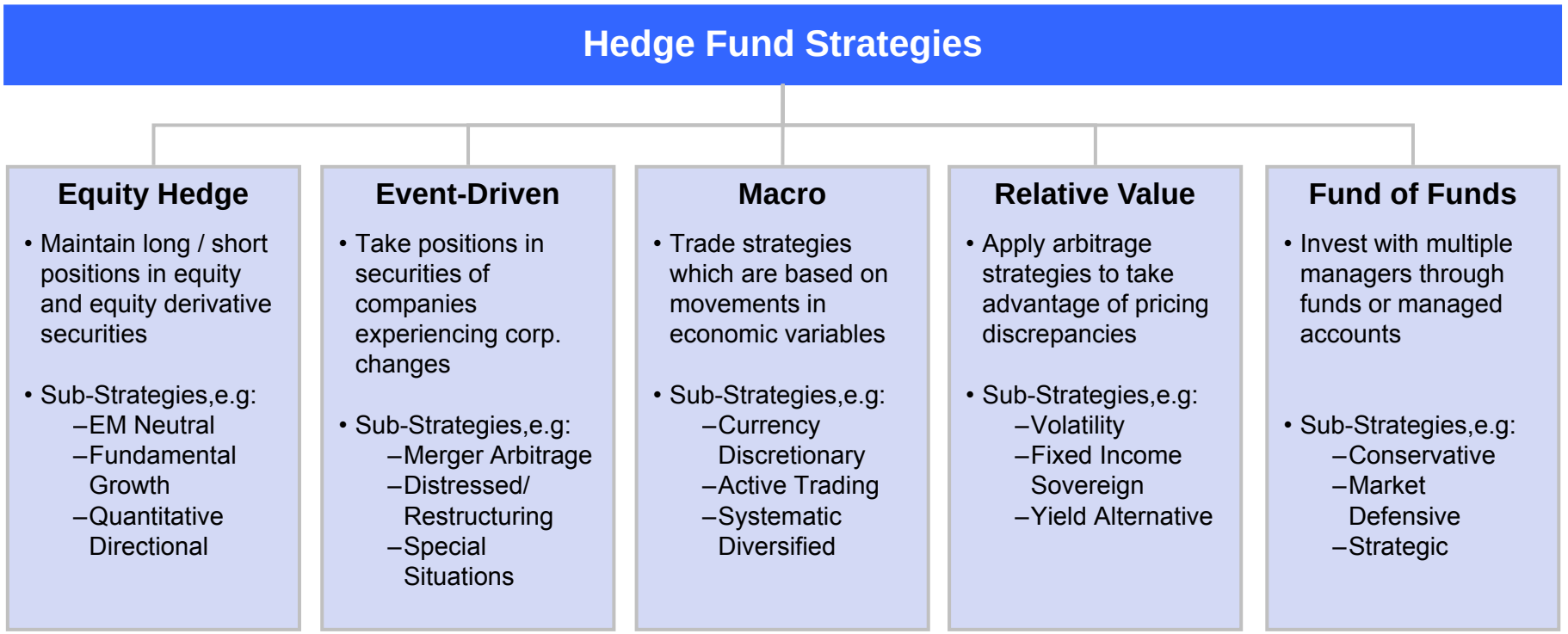
© Prof. Dr. Pascal Gantenbein

Data Source and Sample Selection



© Prof. Dr. Pascal Gantenbein

Hedge Fund Strategies



Source: Own display, adopted from Hedge Fund Research

- A **generally accepted classification** of hedge fund strategies does not exist
- The graphic illustrates **HFR strategy classification** and represents basis of our research
- **Relative performance** within strategy to analyze performance persistence

© Prof. Dr. Pascal Gantenbein

Descriptive Statistics I/III

			Fund series approach					
Year	Total no. of funds at beginning	Total no. of funds at end	Mean return p.a.	Median return p.a.	Std. deviation p.a	Mean return p.m.	Median return p.m.	Std. deviation p.m
1994	337	437	0.0342	0.0241	0.0880	0.0028	0.0020	0.0254
1995	437	574	0.2056	0.1567	0.0854	0.0171	0.0131	0.0247
1996	574	741	0.2020	0.1641	0.0825	0.0168	0.0137	0.0238
1997	741	904	0.1915	0.1640	0.0896	0.0160	0.0137	0.0259
1998	904	1128	0.0587	0.0640	0.1151	0.0049	0.0053	0.0332
1999	1128	1433	0.2620	0.1811	0.1129	0.0218	0.0151	0.0326
2000	1433	1759	0.1468	0.1141	0.1137	0.0122	0.0095	0.0328
2001	1759	2162	0.0963	0.0772	0.0859	0.0080	0.0064	0.0248
2002	2162	2642	0.0448	0.0357	0.0751	0.0037	0.0030	0.0217
2003	2642	3072	0.1749	0.1191	0.0680	0.0146	0.0099	0.0196
2004	3072	3499	0.0937	0.0739	0.0551	0.0078	0.0062	0.0159
2005	3499	3820	0.0957	0.0737	0.0561	0.0080	0.0061	0.0162
2006	3820	3955	0.1232	0.1052	0.0559	0.0103	0.0088	0.0161
2007	3955	3657	0.1140	0.0908	0.0653	0.0095	0.0076	0.0189
2008	3657	2846	-0.1865	-0.1575	0.1155	-0.0155	-0.0131	0.0333

- **Number of hedge funds** increased substantially over the last 15 years
- **2008** was an extremely negative year for hedge funds
- **Time-varying** behaviour
- **Overall, summary statistics** are similar to those described in other studies

© Prof. Dr. Pascal Gantenbein

Descriptive Statistics II/III

Descriptive Statistics						
Factors	**Min. Return**	**Max. Return**	**Mean Return**	**Std. Deviation**	**Skewness**	**Kurtosis**
ALLHF	-0.0623	0.0629	0.0092	0.0172	-0.7606	3.2129
EH	-0.0920	0.1014	0.0114	0.0249	-0.5604	2.9937
ED	-0.0920	0.0536	0.0094	0.0186	-2.0791	8.5702
M	-0.0362	0.0780	0.0111	0.0204	0.3135	0.1947
RV	-0.0888	0.0291	0.0079	0.0126	-3.7498	23.3266
FoF	-0.0630	0.0538	0.0061	0.0161	-0.9133	3.5857
MSW	-0.1646	0.0804	0.0029	0.0412	-0.9856	1.6950
MSEXUS	-0.1572	0.0897	0.0017	0.0426	-0.9801	1.3979
MSEM	-0.2694	0.1362	0.0070	0.0607	-1.0418	2.5516
R3000	-0.1778	0.0803	0.0046	0.0438	-0.9408	1.7862
Rm-Rf	-0.1715	0.0816	0.0031	0.0443	-0.9110	1.4946
BCGA	-0.0369	0.0621	0.0051	0.0158	0.2658	0.6921
BCUSA	-0.0336	0.0387	0.0050	0.0113	-0.2354	0.9004
CUSBIG	-0.0338	0.0574	0.0052	0.0120	0.3425	2.5973
BCGHY	-0.1864	0.0769	0.0050	0.0298	-2.4149	12.6647
JPEMBI	-0.2734	0.1012	0.0081	0.0426	-2.1368	11.3967
BCUST	-0.0439	0.0531	0.0054	0.0137	-0.0973	1.2224
GSCI	-0.2777	0.1766	0.0063	0.0640	-0.4421	1.6289
TWEXB	-0.0356	0.1071	0.0009	0.0148	2.1176	15.3546
SMB	-0.1160	0.1462	0.0019	0.0336	0.4603	1.9898
HML	-0.2079	0.1492	0.0004	0.0412	-0.6590	5.5862
MOM	-0.2504	0.1835	0.0087	0.0506	-0.5629	4.8999

- Unadjusted return confirm **attractive risk-return profile** of hedge funds

© Prof. Dr. Pascal Gantenbein

Descriptive Statistics III/III

	anytime	daily	weekly	monthly	quarterly	yearly	others / n.a.	Total
Subscription period (absolute #)	51	188	135	3967	309	5	133	4788
Subscription period (relative in %)	0.0107	0.0393	0.0282	0.8285	0.0645	0.0010	0.0278	1.0000
Redemption period (absolute #)	39	165	121	2068	1898	237	260	4788
Redemption period (relative in %)	0.0081	0.0345	0.0253	0.4319	0.3964	0.0495	0.0543	1.0000

Performance observation # of months	Absolute #	Relative #	Absolute # in range	Relative # in range
≥ 24 months	4788	1.00	715	0.15
≥ 36 months	4073	0.85	725	0.15
≥ 48 months	3348	0.70	596	0.12
≥ 60 months	2752	0.57	500	0.10
≥ 72 months	2252	0.47	439	0.09
≥ 84 months	1813	0.38	343	0.07
≥ 96 months	1470	0.31	267	0.06
≥ 108 months	1203	0.25	221	0.05
≥ 120 months	982	0.21	212	0.04
≥ 132 months	770	0.16	173	0.04
≥ 144 months	597	0.12	145	0.03
≥ 156 months	452	0.09	117	0.02
≥ 168 months	335	0.07	125	0.03
≥ 180 months	210	0.04	210	0.04

- **Subscription / redemption intervals** represent short-term lock-up periods
- The majority of the funds do have a return history < 60 months
- Overall, sample is **representative, valid, and meaningful** for analysis

© Prof. Dr. Pascal Gantenbein

Research Design and Methodology

- Performance persistence studies basically have **three dimensions**: time horizon, performance measurement, and statistical methodology
  1. Four **time horizons**: 1, 3, 6, and 12 months
  2. Two **performance measures**: raw return (net of fees) and Sharpe ratio
  3. Two **statistical methodologies**: cross product ratio test and the chi-square test (contingency-table based methodologies)

	Winner (W) in Period 2 (test period)	Loser (L) in Period 2 (test period)	
Winner (W) in Period 1 (formation period)	No. of WW **WW / N** WW / (WW + LW) WW / (WW + WL)	No. of WL **WL / N** WL / (WL + LL) WL / (WW + WL)	No. of WW + WL (WW + WL) / N
Loser (L) in Period 1 (formation period)	No. of LW **LW / N** LW / (WW + LW) LW / (LW + LL)	No. of LL **LL / N** LL / (WL + LL) LL / (LW + LL)	No. of LW + LL (LW + LL) / N
	No. of WW + LW (WW + LW) / N	No. of WL + LL (WL + LL) / N	N = WW+WL+LW+LL

Example

ALL funds - return - 1 month horizon			
No. of obs. % of N % of Col % of Row	Winner 2	Loser 2	
Winner 1	105,314 0.2822 0.5644 0.5636	81,538 0.2185 0.4368 0.4364	186,852 0.5006
Loser 1	81,278 0.2178 0.4356 0.4360	105,124 0.2816 0.5632 0.5640	186,402 0.4994
	186,592 0.4999	186,662 0.5001	373,254

$$X^2 = \frac{(WW - D1)^2}{D1} + \frac{(WL - D2)^2}{D2} + \frac{(LW - D3)^2}{D3} + \frac{(LL - D4)^2}{D4}$$

$$CPR = \frac{(WW * LL)}{(WL * LW)}$$

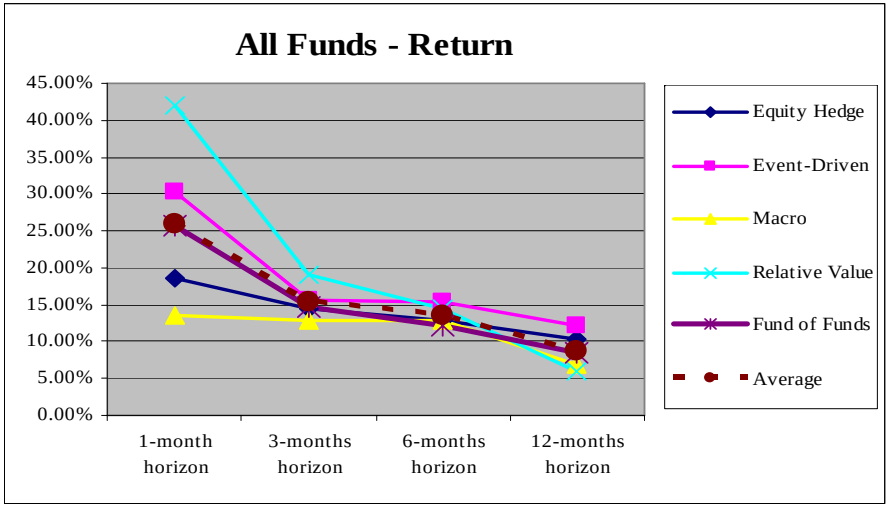
$$Z = \frac{\ln(CPR)}{\alpha_{\ln(CPR)}} = \frac{\ln(CPR)}{\sqrt{\frac{1}{WW} + \frac{1}{WL} + \frac{1}{LW} + \frac{1}{LL}}}$$

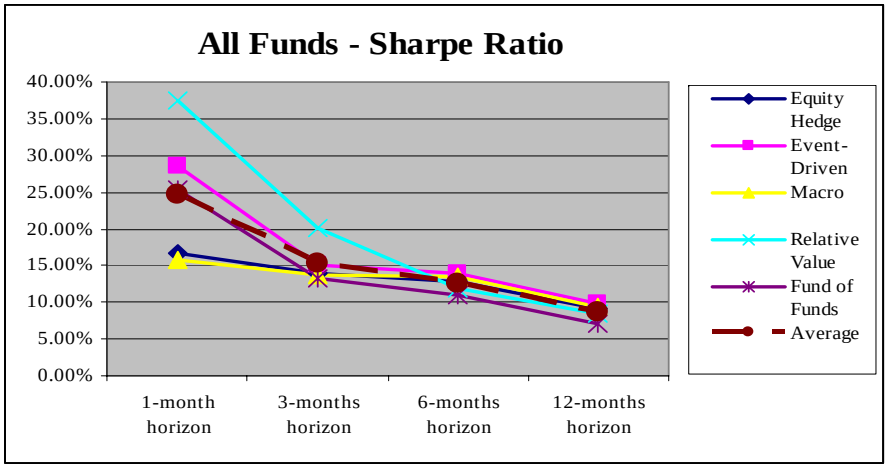
➢ Fundamental principle: **identify persistent winners (WW) and losers (LL)**

© Prof. Dr. Pascal Gantenbein

Empirical Results – Base Case

- Key finding: **Percentage of individual funds** exhibiting statistically significant levels of persistence **decreases as time horizons are lengthened**
- Different levels of persistence among the **five hedge fund strategies**
- Performance persistence is driven by **both persistent losers and persistent winners**
- No indication that the level of performance persistence is significantly related to the choice of **performance measure**
- **Chi-square test** on average results in higher percentages of individual persistent funds than the cross-product ratio test

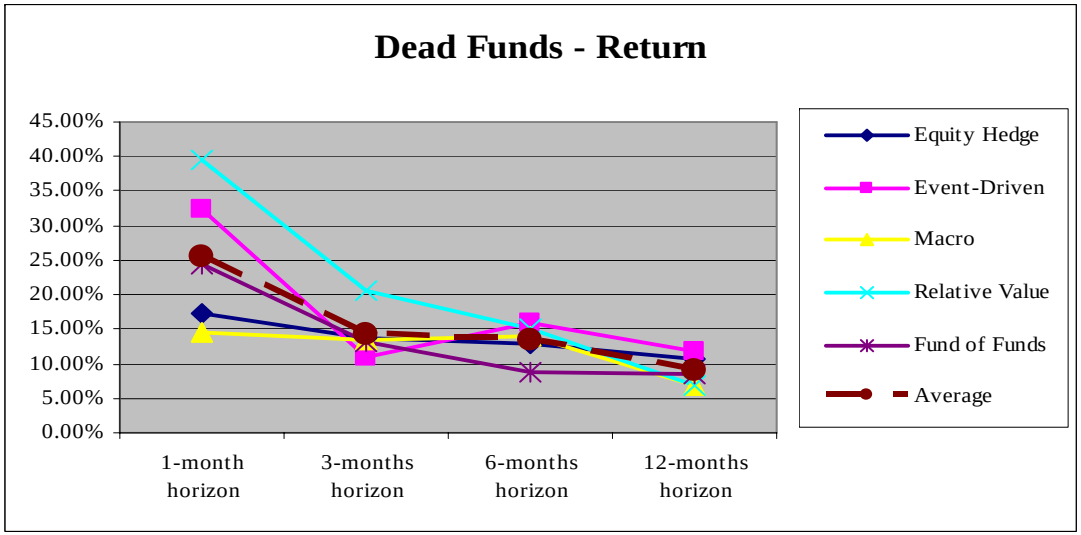


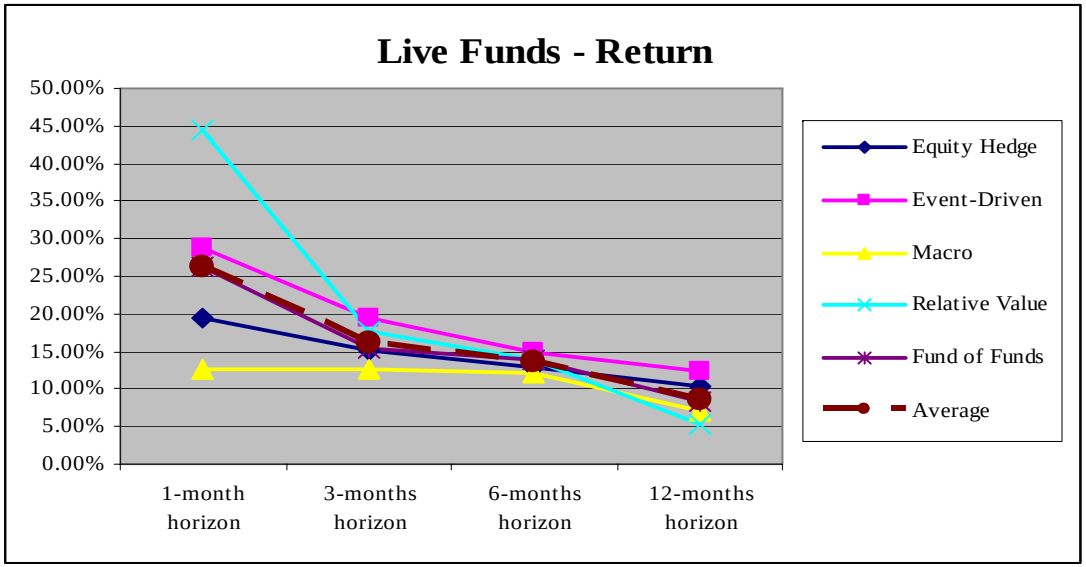


© Prof. Dr. Pascal Gantenbein

Empirical Results – Live and Dead Funds

- Key finding: Performance persistence of **live funds is primarily driven by constant winners**, while performance persistence of **dead funds is primarily driven by constant losers**
- Percentage of persistent funds (for **both dead and live**) significantly **decreases as time horizons are lengthened**
- Results for the four different time horizons indicate that **persistent losers account for a higher proportion** of dead funds than persistent winners among live funds **in relative terms**





© Prof. Dr. Pascal Gantenbein

Conclusion

- Hedge funds are a very heterogeneous asset class – significant differences in the **risk-return profile** of hedge funds / hedge fund strategies
- **Evidence of performance persistence** among hedge funds: at an individual fund level, performance persistence is very limited and primarily **short term in nature**
- **Investor trading restrictions** have a significantly negative impact on the ability to exploit performance persistence
- **Robustness checks** confirm findings
- The probability that a fund exhibits **performance persistence at more than one time horizon** is very limited
- Overall, results have a **high practical relevance**
- **Topics for future research** are manifold (e.g., analyze persistence for periods shorter than 1-months)

© Prof. Dr. Pascal Gantenbein